

paper, an engine with high compression ratio, lean burn and turbo-charging was investigated using techniques for improving thermal efficiency while getting equivalent IMEP to the base diesel engine. By adopting these techniques, indicated thermal efficiency of the engine was increased by about 23% over that using the usual compression ratio, stoichiometric combustion and natural aspiration systems.

9733323 Clarification of a Three-Dimensional Diffusion Spray Mechanism Using the Multi-impingement-wall Spray Image Analysis Using the Semiconductor Laser Beam Scanning Method Song Fei (Nippon Institute of Technology Graduate School), Kyoko Okamoto, Masaru Ogura (Nippon Institute of Technology), Noboru Tazima (Nippon Institute of Technology)

The semiconductor laser beam scanning method was used to analysis the distribution of the spray using the Multi-impingement-wall. The scattered light photograph was taken by means of an intermittently scanning laser beam, and the picture was composed by microcomputer from line to section. It found that the distribution of spray droplets in the section was almost uniform.

9733332 Study on Three Dimensional Spray Masaru Ogura (Nippon Institute of Technology), Kyoko Okamoto, Katsuya Saito (Nippon Institute of Technology Graduate School)

In order to design the most suitable conical nozzle, the authors proposed that for dispersion to be effective, a large three dimension spray must be formed. In order to prove this experiments were conducted to photograph the process of spray formation and measure spray droplets distribution by a semiconductor laser beam. The experimental results show that spray disperses in many directions, and it was found that an effective three dimensional spray could be formed.

9733341 The Jet Character of CNG Injector Used in MPI Mode Xu Boyan (Chiba University Graduate School), Mikio Furuyama (Chiba University)

A theoretical model was developed that assumes the natural gas transient jet can be characterized as a spherical vortex interacting with a steady-state jet.

Schlieren photographs revealed low pressure gas jet starting and extending the process from the nozzle. Comparison between the model and experimental results for the tip penetration of a circular hole jet show them to be about the same, and proportional to the square root of time.

9733350 A Trial Projection of the Stirling Cycle Refrigerator and an Experimental Study – Experimental Results of Oneway Piston Ring Hitoshi Terauchi, Shoichi Kido, Shunichi Furuya, Takashi Kobayashi (Zexel R&D Center)

A Stirling cycle refrigerator was constructed for an experimental study on the refrigeration characteristics. The effect of the oneway-type piston ring was applied to this refrigerator, which was investigated under conditions of rotation speed 600–1200 rpm and helium gas pressure 2–4 MPa. Experimental results suggest that the net cooling capacity and the COP were interested 1.04–1.15 times and 1.06–1.18 times compared with the normal-type piston ring by using the oneway-type piston ring.

9733369 Development of Sub-Cool System Hiroki Matsuo, Yasushi Yamanaka, Kaoru Tuzuki, Toshio Tsuboko (Denso Corporation), Youji Nishimura (Toyota Motor Co., Ltd.)

The important problems to be tackled from the point of view of preventing global warming are to reduce the power consumption of car air-conditioning systems and to reduce refrigerant used in those systems. Our approach to the task is to enhance system efficiency by utilizing sub-cooling at the outlet of the condenser and also to reduce the amount of refrigerant behavior by pattern analysis. This approach has created a simple system construction using an integrated condenser/receiver device.

9733378 Development of the Scroll-type Compressor (SCO8) Shigeru Hisanaga (Denso Corporation), Yasushi Watanabe (Toyoda Automatic Loom Works Ltd.)

The new SCO8 scroll compressor for automotive air-conditioning applications was developed by enhancing features of the current scroll type compressor and pursuing simplification of the structure in combination with the newly developed mechanism.

As a result, this has achieved various superior characteristics such as low noise, high efficiency and improved reliability.